

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

**TD62101P, TD62101F, TD62103P, TD62103F**  
**TD62104P, TD62104F, TD62105P, TD62105F**

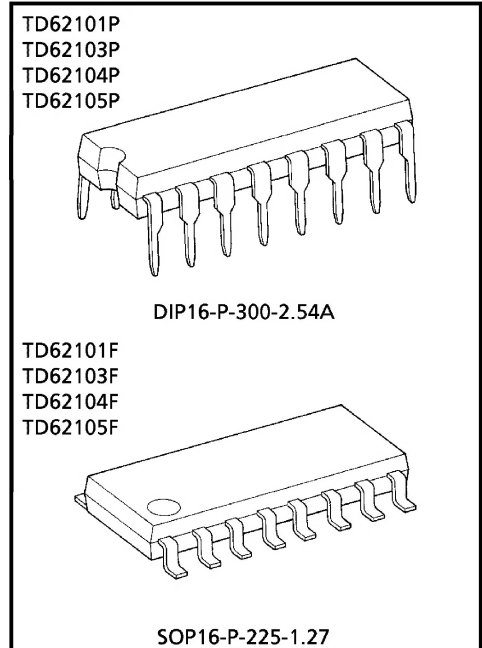
**7CH DARLINGTON SINK DRIVER**

The TD62101P/F series are high-voltage, high-current darlington drivers comprised of seven NPN darlington pairs.

**FEATURES**

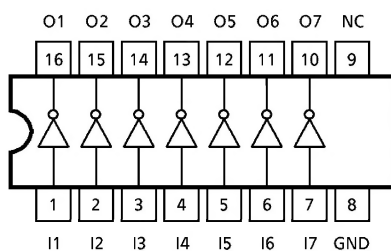
- Output current (single output) : 500mA (Max.)
- High sustaining voltage output : 25V (Min.)
- Inputs compatible with various types of logic.
- Package type-P : DIP-16 pin.
- Package type-F : SOP-16 pin.

TYPE	INPUT BASE RESISTOR	DESIGNATION
TD62101P/F	External	General Purpose
TD62103P/F	2.7k $\Omega$	TTL, 5V CMOS
TD62104P/F	10.5k $\Omega$	6~15V CMOS, PMOS
TD62105P/F	20k $\Omega$	12~25V CMOS, PMOS



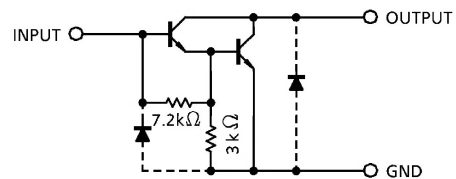
Weight  
DIP16-P-300-2.54A : 1.11g (Typ.)  
SOP16-P-225-1.27 : 0.16g (Typ.)

**PIN CONNECTION (TOP VIEW)**



**SCHEMATICS (EACH DRIVER)**

**TD62101P/F**



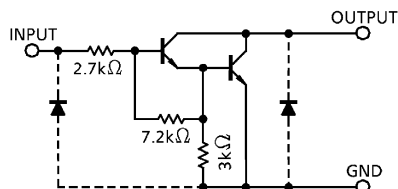
(Note) The input and output parasitic diodes cannot be used as clamp diodes.

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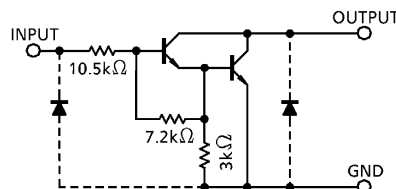
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**SCHEMATICS (EACH DRIVER)**

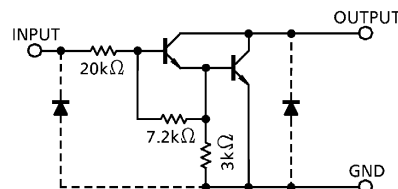
TD62103P / F



TD62104P / F



TD62105P / F



(Note) The input and output parasitic diodes cannot be used as clamp diodes.

**MAXIMUM RATINGS (Ta = 25°C)**

CHARACTERISTIC	SYMBOL	RATING	UNIT
Output Sustaining Voltage	$V_{CE(SUS)}$	- 0.5 ~ 25	V
Output Current	$I_{OUT}$	500	mA / ch
Input Voltage	$V_{IN}$ (Note 1)	- 0.5 ~ 30	V
Input Current	$I_{IN}$ (Note 2)	25	mA
Power Dissipation	P	1.0	W
	F	0.625 (Note 3)	
Operating Temperature	P	- 30 ~ 75	°C
	F	- 40 ~ 85	
Storage Temperature	$T_{stg}$	- 55 ~ 150	°C

(Note 1) Except TD62101P / F

(Note 2) Only TD62101P / F

(Note 3) On Glass Epoxy PCB (30 × 30 × 1.6mm Cu 50%)

**RECOMMENDED OPERATING CONDITIONS (Ta = - 40 ~ 85°C and Ta = - 30 ~ 75°C for only Type-P)**

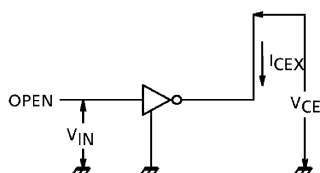
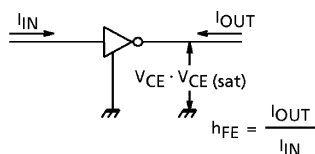
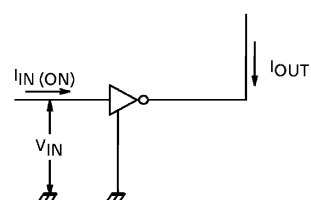
CHARACTERISTIC	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Output Sustaining Voltage	$V_{CE(SUS)}$		0	—	25	V
Output Current	$I_{OUT}$	DC 1 Circuit	0	—	350	mA / ch
		$T_{pw} = 25ms$ , Duty = 10% 7 Circuits, Ta = 85°C, Tj = 120°C	0	—	300	
Input Voltage	Except TD62101P / F	$V_{IN}$	0	—	20	V
Input Current	Only TD62101P / F	$I_{IN}$	—	—	10	mA
Power Dissipation	P	(Note)	—	—	0.44	W
	F		—	—	0.325	

(Note) On Glass Epoxy PCB (30 × 30 × 1.6mm Cu 50%)

## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

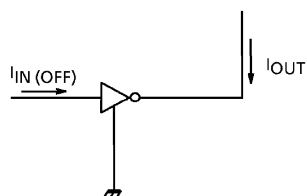
CHARACTERISTIC			SYMBOL	TEST CIRCUIT	TEST CONDITION		MIN.	TYP.	MAX.	UNIT	
Output Leakage Current		P	I <sub>CEX</sub>	1	V <sub>CE</sub> = 25V I <sub>IN</sub> = 0	Ta = 75°C	—	—	100	μA	
		F				Ta = 85°C	—	—	100		
Collector-Emitter Saturation Voltage			V <sub>CE</sub> (sat)	2	I <sub>OUT</sub> = 350mA, I <sub>IN</sub> = 600μA		—	1.3	2.2	V	
					I <sub>OUT</sub> = 200mA, I <sub>IN</sub> = 400μA		—	1.1	2.0		
					I <sub>OUT</sub> = 100mA, I <sub>IN</sub> = 200μA		—	1.0	1.8		
DC Current Transfer Ratio			h <sub>FE</sub>	2	V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 350mA		1000	—	—		
Input Current	Output On	TD62101P / F	I <sub>IN</sub> (ON)	3	V <sub>IN</sub> = 1.5V, I <sub>OUT</sub> = 350mA		—	0.25	—	mA	
		V <sub>IN</sub> = 1.75V, I <sub>OUT</sub> = 350mA			—	1.00	—				
		V <sub>IN</sub> = 2.4V, I <sub>OUT</sub> = 350mA			—	0.4	0.7				
		V <sub>IN</sub> = 13.5V, I <sub>OUT</sub> = 350mA			—	1.2	1.7				
		V <sub>IN</sub> = 20.0V, I <sub>OUT</sub> = 350mA			—	1.0	1.5				
	Output Off	P	I <sub>IN</sub> (OFF)	4	I <sub>OUT</sub> = 500μA	Ta = 75°C		50	65	—	μA
		F				Ta = 85°C		50	65	—	
Input Voltage	Output On	TD62103P / F	V <sub>IN</sub> (ON)	5	V <sub>CE</sub> = 2V	I <sub>OUT</sub> = 125mA	—	—	2.1	V	
		TD62104P / F					—	—	4		
		TD62105P / F					—	—	6.4		
		TD62103P / F				I <sub>OUT</sub> = 250mA	—	—	2.7		
		TD62104P / F					—	—	7		
		TD62105P / F					—	—	12		
		TD62103P / F				I <sub>OUT</sub> = 350mA	—	—	3.3		
		TD62104P / F					—	—	8.8		
		TD62105P / F					—	—	15		
Input Capacitance			C <sub>IN</sub>	6	V <sub>IN</sub> = 0, f = 1MHz		—	15	—	pF	
Turn-On Delay			t <sub>ON</sub>	7	V <sub>OUT</sub> = 25V, R <sub>L</sub> = 70Ω C <sub>L</sub> = 15pF		—	0.1	—	μs	
Turn-Off Delay			t <sub>OFF</sub>		—	0.2	—				

## TEST CIRCUIT

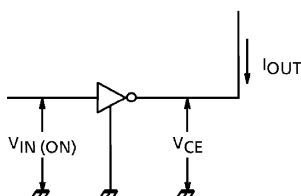
1.  $I_{CEX}$ 2.  $h_{FE}, V_{CE(sat)}$ 3.  $I_{IN(ON)}$ 

# TEST CIRCUIT

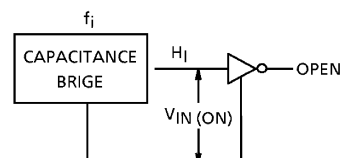
## 4. $I_{IN}$ (OFF)



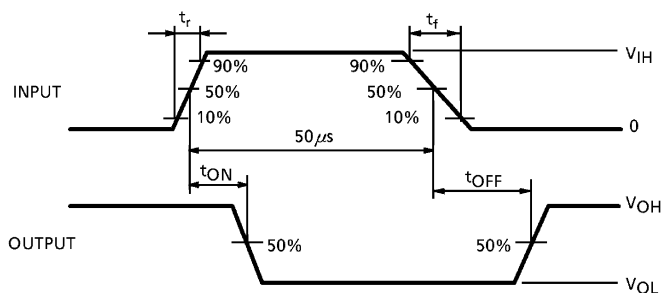
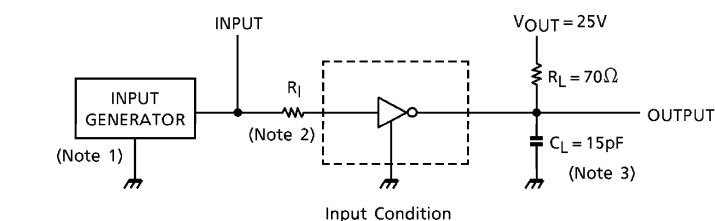
## 5. $V_{IN}$ (ON)



## 6. $C_{IN}$



## 7. $t_{ON}$ , $t_{OFF}$



(Note 1) Pulse Width  $50\mu s$ , Duty Cycle 10%  
Output Impedance  $50\Omega$ ,  $t_r \leq 5ns$ ,  $t_f \leq 10ns$

(Note 2) See right.

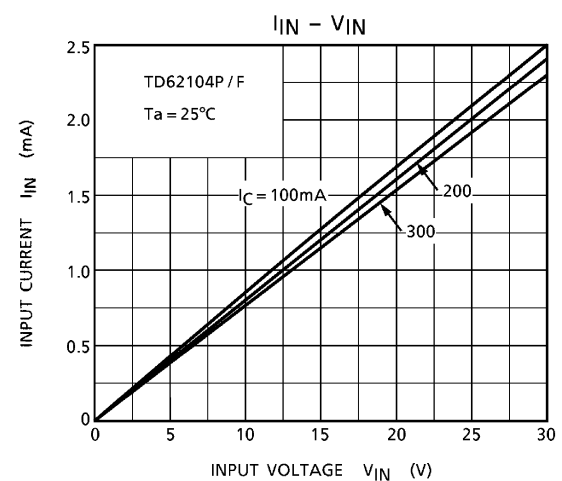
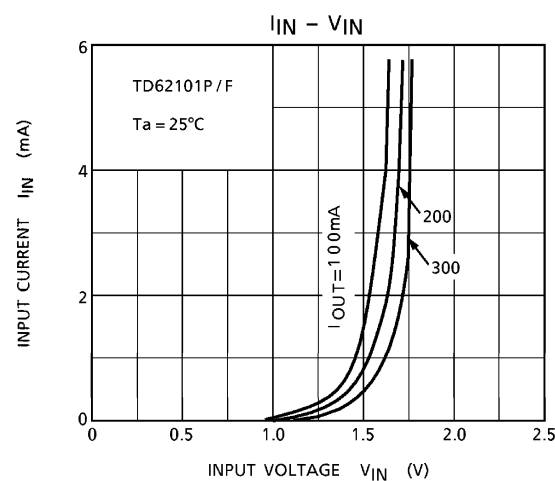
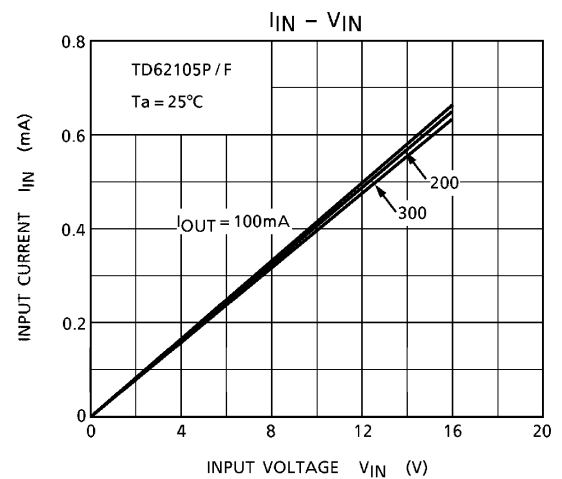
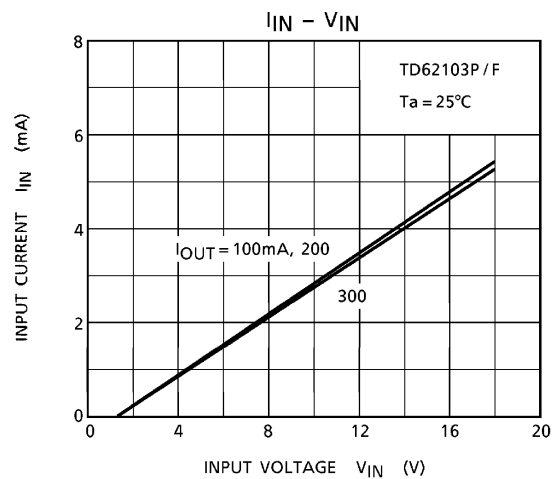
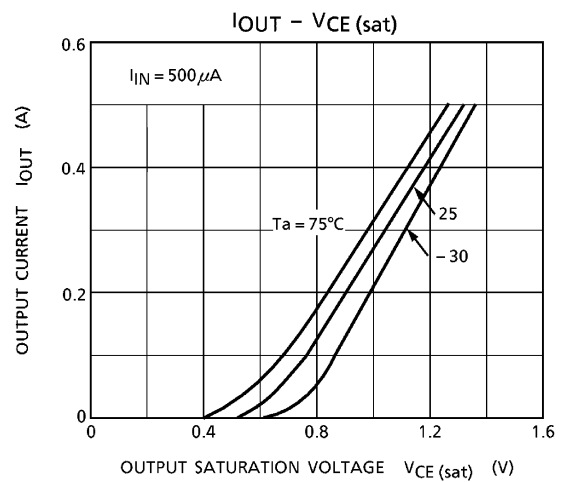
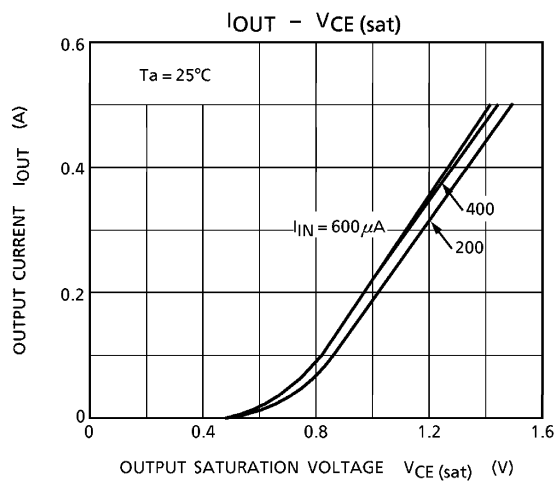
(Note 3)  $C_L$  includes probe and jig capacitance.

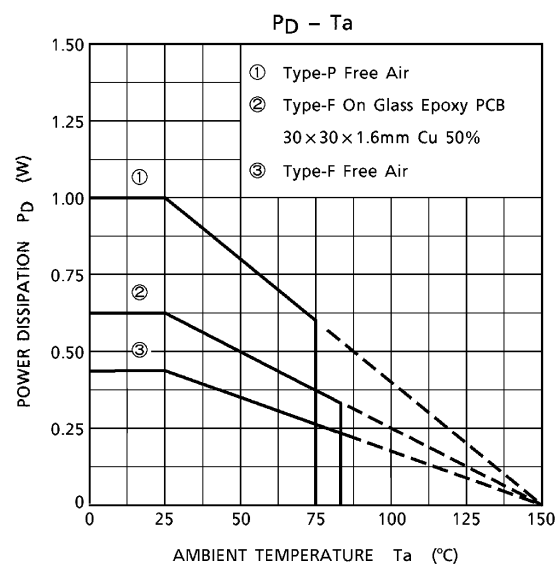
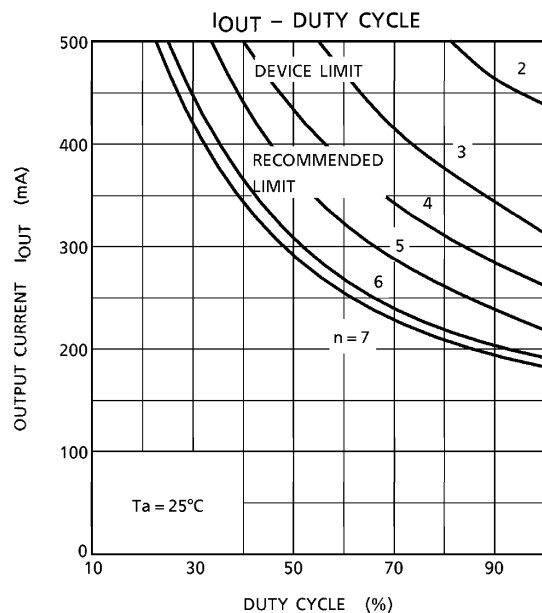
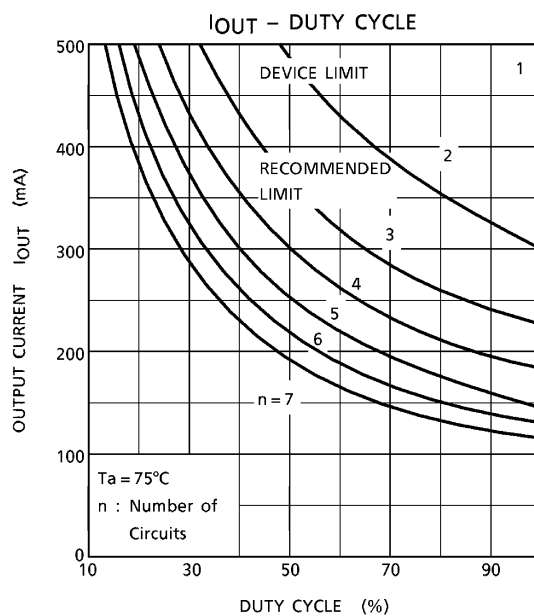
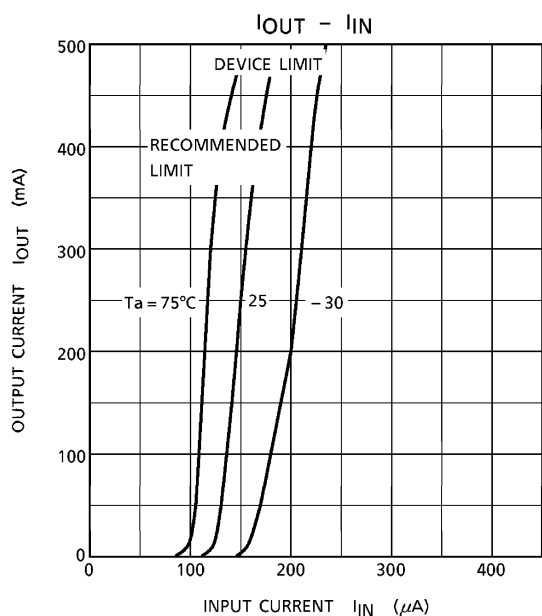
## INPUT CONDITION

TYPE NUMBER	$R_I$	$V_{IH}$
TD62101P / F	$2.7k\Omega$	3V
TD62103P / F	$0\Omega$	3V
TD62104P / F	$0\Omega$	8V
TD62105P / F	$0\Omega$	15V

## PRECAUTIONS for USING

Utmost care is necessary in the design of the output line, GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

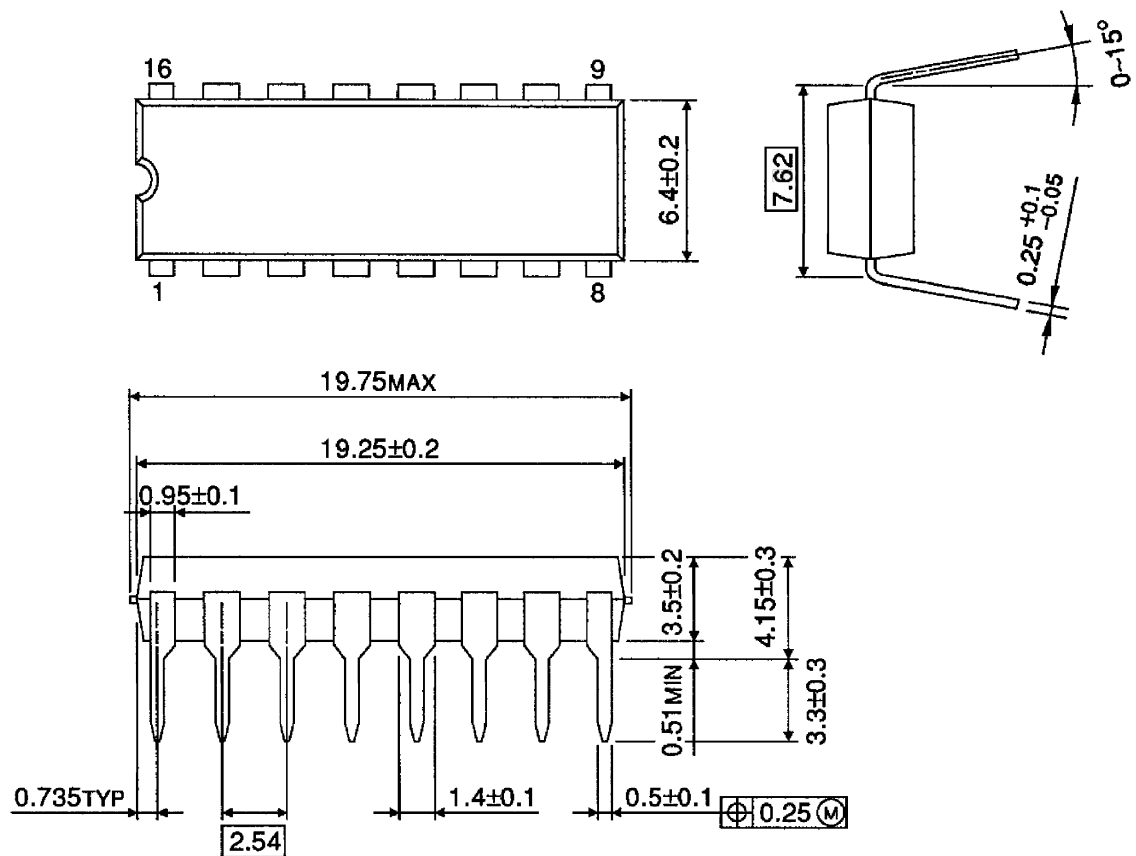




**OUTLINE DRAWING**

DIP16-P-300-2.54A

Unit : mm

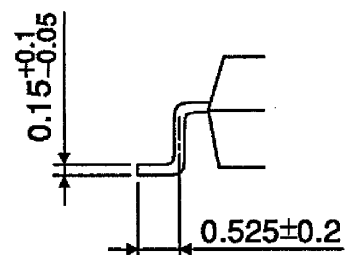
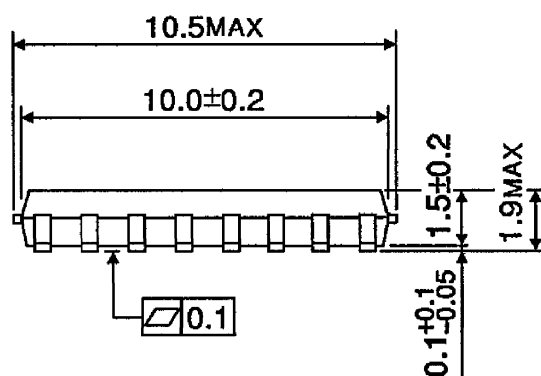
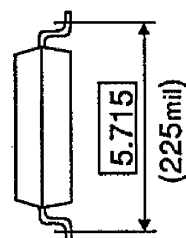
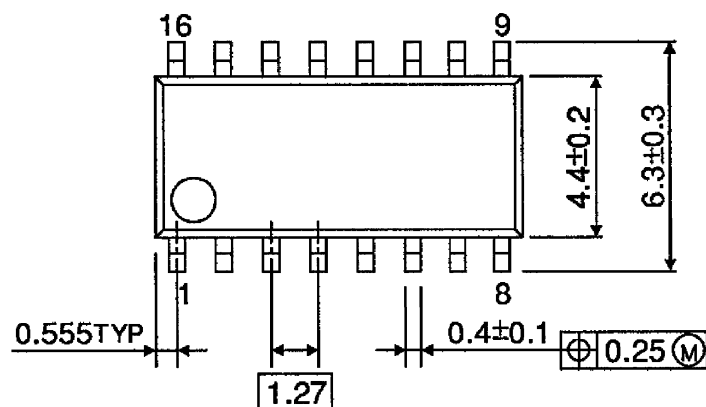


Weight : 1.11g (Typ.)

**OUTLINE DRAWING**

SOP16-P-225-1.27

Unit : mm



Weight : 0.16g (Typ.)